

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

Claim 1 (original): A method for filtering data, the method comprising:  
receiving a plurality of data samples;  
computing a locus of the samples;  
normalizing a value of an input sample to a range centered on the locus;  
passing the data through a distance-based filter; and  
normalizing an output value of the distance-based filter to a predetermined output range.

Claim 2 (original): The method of claim 1 wherein the distance-based filter further comprises a median filter.

Claim 3 (original): The method of claim 1 wherein the distance-based filter further comprises a low-pass filter.

Claim 4 (original): The method of claim 1 wherein the distance-based filter further comprises one of a band-pass filter and a high-pass filter.

Claim 5 (original): The method of claim 1 wherein computing a locus of the samples comprises computing an average of a last two of the samples.

Claim 6 (original): The method of claim 1 wherein computing a locus of the samples comprises computing one of an arithmetic mean, a geometric mean, a harmonic mean, and a quadratic mean of the samples.

Claim 7 (original): The method of claim 1 wherein computing a locus of the samples comprises computing an average of a last two of the samples together with the input sample.

Claim 8 (original): The method of claim 1 wherein computing a locus of the samples comprises computing an average of a last three of the samples.

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Claim 9 (original): The method of claim 1 wherein computing a locus of the samples comprises computing an average of a last three of the samples together with the input sample.

Claim 10 (original): The method of claim 1 wherein computing a locus of the samples comprises selecting a previous filter output value.

Claim 11 (original): A method for filtering data, the method comprising:

- determining a current locus of a plurality of data samples as a function of signal history;
- determining a current normalizing range as a function of the current locus;
- normalizing an input value to the current normalizing range;
- passing the input value and the current locus through a distance-based filter; and
- normalizing an output value of the distance-based filter to the current normalizing range.

Claim 12 (original): The method of claim 11 wherein the distance-based filter is one of median filter, a low-pass filter, a high-pass filter, and a band-pass filter.

Claim 13 (original): The method of claim 11 wherein determining a current locus of the data samples further comprises determining one of an arithmetic mean, a geometric mean, a harmonic mean, and a quadratic mean of the data samples.

Claim 14 (original): A filter device, comprising:

- a means for receiving a plurality of data samples;
- a means for computing a locus of the samples;
- a means for computing a distance between an input value and the locus; and
- a means for determining an output value as a function of a difference between the input value and one of the plurality of data samples.

Claim 15 (original): The filter device of claim 14, further comprising a means for comparing the distance between the input value and the locus with a predetermined threshold value.

Claim 16 (original): The filter device of claim 15, further comprising a means for normalizing the distance between the input value and the locus when the distance exceeds a predetermined limit.

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Claim 17 (original): The filter device of claim 16 wherein normalizing the distance between the input value and the locus includes adjusting the sample to be within one-half circle of the locus.

Claim 18 (original): The filter device of claim 14, further comprising a means for comparing the output value with a predetermined threshold value.

Claim 19 (original): The filter device of claim 18, further comprising a means for normalizing the output value when the output value exceeds a predetermined limit.

Claim 20 (original): The filter device of claim 19 wherein normalizing the output value includes adjusting the output value to be within a predetermined output range.

Claim 21 (original): A system for circular distance normalization of filtered data, the system comprising:

- a) a first memory for storing a plurality of machine instructions;
- b) a second memory for storing a plurality of data samples; and
- c) a processor coupled to the first and second memories, the processor executing the plurality of machine instructions to implement a plurality of functions, the functions including:
  - i) processing at least a portion of the plurality of data samples to compute a locus of the samples;
  - ii) computing a distance between an input value and the locus;
  - iii) determining an output value by computing a difference between the input value and one of the plurality of data samples; and
  - iv) providing the output value.

Claim 22 (original): The system of claim 21 wherein the function of determining an output value includes applying a distance-based filter to the plurality of data samples.

Claim 23 (original): The system of claim 21 wherein the functions executed by the processor further include normalizing the distance between the input value and the locus when the distance exceeds a predetermined threshold value.

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Claim 24 (original): The system of claim 21 wherein the functions executed by the processor further include normalizing the output value when the output value exceeds a predetermined threshold value.

Claim 25 (original): The system of claim 21 wherein the function of processing at least a portion of the plurality of data samples to compute a locus of the samples includes computing an approximation of the locus of the samples.

Claim 26 (original): The system of claim 25 wherein computing a locus of the samples comprises computing an average of data samples retrieved from the second memory.

Claim 27 (original): The system of claim 21 wherein computing a locus of the samples comprises computing an average of a plurality of recent data samples.

Claim 28 (original): A computer program product for filtering data, wherein the computer program product comprises:

a computer-readable storage medium; and  
computer-readable program code means embodied in the medium, the computer-readable program code means comprising:  
first computer-readable program code means for determining a locus of a received plurality of data samples,  
second computer-readable program code means for normalizing a value of an input sample to a range centered on the locus determined from the first computer-readable program code means,  
third computer-readable program code means are included for distance-based filtering of the data, and  
fourth computer-readable program code means are included for normalizing an output value of the distance-based filter to a predetermined output range.

Claim 29 (original): The computer program product of claim 28 wherein the first computer-readable program code means determines the locus of the samples by determining an average of at least a portion of the data samples.

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Claim 30 (original): The computer program product of claim 28 wherein the first computer-readable program code means determines the locus of the samples by determining an average of at least a last two of the data samples.

Claim 31 (original): The computer program product of claim 28 wherein the first computer-readable program code means determines the locus of the samples by determining an average of at least a last two samples together with the input sample.

Claim 32 (original): The computer program product of claim 28 wherein the first computer-readable program code means determines the locus of the samples by determining an average of at least a last three of the data samples.

Claim 33 (original): The computer program product of claim 28 wherein the first computer-readable program code means determines the locus of the samples by determining an average of at least a last three of the data samples together with the input sample.

Claim 34 (original): The computer program product of claim 28 wherein the first computer-readable program code means determines the locus of the samples by selecting a previous filter output value.

Claim 35 (original): The computer program product of claim 28 wherein the distance-based filtering of the third computer-readable program code means further comprises a median filtering.

Claim 36 (original): The computer program product of claim 28 wherein the first computer-readable program code means determines the locus of the samples by computing relative to at least a portion of the samples one of an arithmetic mean, a geometric mean, a harmonic mean, and a quadratic mean.

Claims 37-48 (cancelled)

Claim 49 (new): The method of claim 1 wherein receiving a plurality of data samples further comprises receiving a plurality of normalized data samples.

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Claim 50 (new): The method of claim 11, further comprising normalizing a plurality of data samples, and

wherein determining a current locus of a plurality of data samples as a function of signal history further comprises determining a current locus of a plurality of the normalized data samples.

Claim 51 (new): The filter device of claim 14 wherein the means for receiving a plurality of data samples further comprises a means for receiving a plurality of normalized data samples.

Claim 52 (new): The system of claim 21 wherein the second memory for storing a plurality of data samples further comprises a memory for storing a plurality of normalized data samples.

Claim 53 (new): The computer program product of claim 28 wherein the first computer-readable program code means for determining a locus of a received plurality of data samples further comprises computer-readable program code means for determining a locus of a received plurality of normalized data samples.